ULTIMETER® 100

OWNER'S MANUAL

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INSTRUCTIONS
ULTIMETER II SELF-EMPTYING RAIN GAUGE

The Rain Gauge is normally mounted on a wooden platform. For best accuracy the platform must be as level as possible. To mount the gauge, first lift the entire top off the base, which is the bottom 3/8 inch. No tools are required, but the top can be a little tricky to remove. It's like removing the top of a Styrofoam drinking cup. You may have to lift a little at a time, working your way around the circumference once or twice. There are three mounting holes in the base and packed inside are three wood screws for securing the gauge. You will also find three spacer washers. Place one washer on each screw, under the gauge. This will raise the gauge slightly above the mounting platform to provide clearance for the electrical cable. If you plan to use a metal platform, you can use stainless steel nuts and bolts to secure the rain gauge, but you should still install the spacer washers.

> **CAUTION**: Do not touch or wipe off the white coating you'll see on the rain gauge mechanism. It's a white silicone spray used to ensure that all the rain water "slides" out of the containers as the gauge empties itself.

After the gauge is installed, plan to check it every few months to be sure the funnel is clear. If the funnel is starting to get clogged by tree debris or insects, remove and flush it out with a hose. If any debris has gotten inside the gauge, you can usually just gently flow water over the mechanism to clean it.

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QUICK START GUIDE

FOR THOSE WHO DON'T HAVE TIME TO READ INSTRUCTIONS

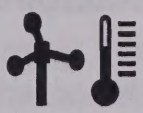
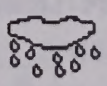
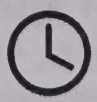
(AND THOSE WHO DO)

In addition to these few "Quick Start" paragraphs, please be sure to read the section on installation very carefully. It includes important safety information as well as time saving installation tips.

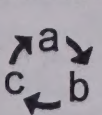
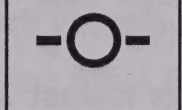
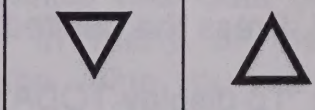
SUGGESTION: DO NOT UNCOIL CABLES UNTIL YOU HAVE TESTED AND BECOME FAMILIAR WITH ALL COMPONENTS AND ARE READY TO INSTALL THE SYSTEM.

ABOUT THE KEYBOARD

There are six "data keys", each identified by a symbol as shown below:

					
WIND SPEED	WIND CHILL	TEMP	RAIN	TIME	DATE

In addition, there are six "utility keys", each identified by a symbol as shown below:

					
SCAN	LAMP	CLEAR	ALARM	DOWN	UP

CONNECT SYSTEM COMPONENTS

Refer to Wiring Diagram in the section "Installing Your *ULTIMETER 100* Components." Connect components by plugging cables into receptacles as shown.

TO DISPLAY WIND DIRECTION

After installation, the *ULTIMETER 100* will constantly indicate the prevailing wind direction on its 16 point compass rose. The system minimizes confusing "jitters" by ignoring momentary direction changes that occur during transient wind gusts. It also avoids erroneous readings, by "locking" the wind direction display when there is no wind, i.e. when the cups are not spinning. Therefore, in order to test or demonstrate the wind direction function, you must spin the cups. You'll find it is best to blow somewhat steadily on the cups, rather than abruptly spinning the anemometer rotor with your fingers.

TO DISPLAY WIND SPEED, WIND CHILL, TEMPERATURE, TIME, OR DATE

Press and release the desired data key: , , , , or . The corresponding symbol will appear on the screen and the current data value will be displayed.

NOTE: When you first press , the instrument will display the outdoor temperature.

TO DISPLAY INDOOR TEMPERATURE (REQUIRES OPTIONAL SENSOR)

a) Press and release to display outdoor temperature.

b) Next, press and release a second time to change display from outdoor reading to indoor reading.

TO DISPLAY HIGHEST AND LOWEST READINGS

a) Press the desired data key to display the current value.

b) To display TODAY'S highest or lowest values, press or once. The display will repeatedly cycle through today's date, today's high or low value, and the time at which it occurred.

c) To display YESTERDAY'S highest or lowest values, press or a second time. The display will repeatedly cycle through yesterday's date, yesterday's high or low value, and the time at which it occurred.

d) To display the highest or lowest values SINCE LAST RESET, press [△] or [▽] a third time. The display will repeatedly cycle through: the date on which the high or low occurred, the highest or lowest value since last reset, and the time at which it occurred. This display mode is easily recognized by the flashing ▦ when the date is displayed.

NOTE: THIS USER-RESETTABLE HIGH/LOW MEMORY FUNCTION IS THE SAME AS THE HIGH/LOW MEMORY FOUND ON CONVENTIONAL WEATHER STATIONS (INCLUDING THE ORIGINAL *ULTIMETER II*) THAT DO NOT RETAIN TODAY'S AND YESTERDAY'S HIGHEST AND LOWEST RECORDINGS.

TO DISPLAY RAINFALL

a) To display TODAY'S rainfall (since midnight), press [☔].

b) To display YESTERDAY'S rainfall (from midnight to midnight) press [△]. The display will alternate between yesterday's date and yesterday's total rainfall.

c) To display the LONG-TERM ACCUMULATED rainfall (since you last reset this value to zero), press [△] again. The display will alternate between the date you last reset this total and the rainfall accumulation since that date.

TO CHANGE MEASUREMENT UNITS OR FORMAT

NOTE: The *ULTIMETER 100* is designed to minimize the chance of someone else accidentally clearing your data or changing your settings. That is why, in many of the procedures below, you must first display the value you wish to change, then press and hold a key for 3-4 seconds before settings are cleared or changed.

Use the procedure below to select: Wind Speed in mph, m/s, knots, or km/h; Temperatures in Fahrenheit or Celsius; Time in 12- or 24-hr format; Date in day/month or month/day format; Rainfall increments of 0.01 in, 0.25 mm, 0.1 in, 0.1 mm, or 2.5 mm according to your preference and the type of rain gauge you are using.

a) Press and release the desired data key: , , , , or .

NOTE: Units for wind chill will be the same as for temperature.

b) Press the same data key a second time AND KEEP IT PRESSED UNTIL THE DISPLAY CHANGES. Repeat this step until data is displayed in the desired units or format.

TO ADJUST TIME, DATE, AND LEAP YEAR SETTING

This instrument features a perpetual calendar. For it to operate correctly, you must adjust the leap year setting before you set the date. If the current year is a leap year (1996, 2000, 2004, etc.), skip to step (c) below.

a) Press and release and simultaneously. The clock and calendar symbols will appear on the screen and the instrument will briefly display LP (for LeaP year). Then it will display the leap year setting, which is initially 0.

b) Press and KEEP IT PRESSED until the leap year setting begins to change. Then press or as required until the leap year setting shows the number of years until leap year, i.e. "1" if the present year is 1995, "0" if the present year is 1996, "3" for 1997, "2" for 1998, and "1" for 1999.

c) Press and release to set time or to set date.

d) Press and hold or as required until the displayed value is close to correct, then press repeatedly until correct setting is displayed. Press any data key to return to normal operation.

ANSWERS TO A FEW MOST LIKELY QUESTIONS . . .

WHAT IS THE BUTTON FOR?

This button activates display backlighting, for viewing in a dark room. Pressing the button once turns backlighting on, and pressing it again turns it off. It's best to use backlighting only when needed. This will extend lamp life and assure most accurate indoor temperature readings. We recommend that you always turn off backlighting when not in use.

WHAT IS THE MODULAR 6 CONDUCTOR JACK ON THE SIDE OF THE CONTROL UNIT?

It is where the optional Indoor Temperature Sensor is installed.

WHAT IS THE UNUSED RECEPTACLE ON THE JUNCTION BOX?

This jack should not be used with the *ULTIMETER 100*, and no sensor should be plugged into this receptacle or damage could result.

I. INTRODUCTION

Congratulations on selecting The *ULTIMETER 100* Home Weather Station. To take full advantage of its advanced features, please take a few minutes to read through and follow this short booklet. Its simple step-by-step instructions will speed you through system installation and help assure you many years of complete satisfaction.

SUGGESTION: DO NOT UNCOIL CABLES UNTIL YOU HAVE TESTED AND BECOME FAMILIAR WITH ALL COMPONENTS AND ARE READY TO INSTALL THE SYSTEM.

IMPORTANT NOTE CONCERNING WIND DIRECTION:
The *ULTIMETER 100* is designed to detect and display the prevailing wind direction on its 16 point compass rose. The system minimizes confusing "jitters" by ignoring momentary direction changes that occur during transient wind gusts. It also avoids erroneous readings, by "locking" the direction display when there is no wind, i.e. when the cups are not spinning. Therefore, in order to test or demonstrate the wind direction function, you must spin the cups. You'll find it is best to blow somewhat steadily on the cups, rather than abruptly spinning the anemometer housing with your fingers.

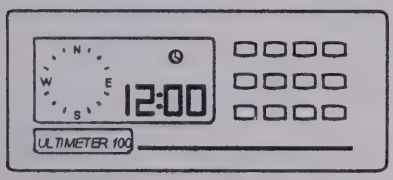
II. PRE-INSTALLATION TESTING

Before you uncoil any cables, you should interconnect and test the system components, as described below. This will allow you to become familiar with the system and assure that all components are functioning properly before you install them.

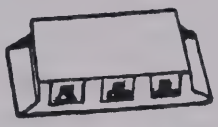
Setup

1. Carefully remove each component from its shipping container and place them all on a clear work area.

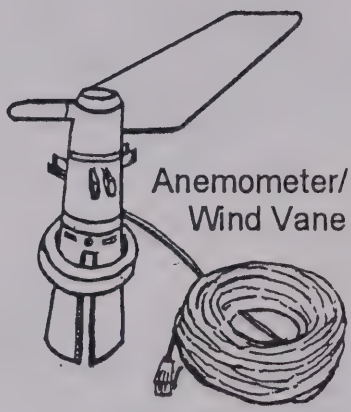
2. As shown below, identify the basic system components and any accessories you have ordered.



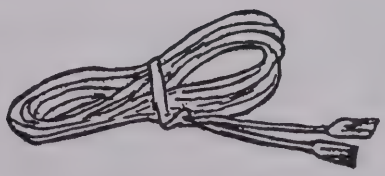
Keyboard/Display Unit



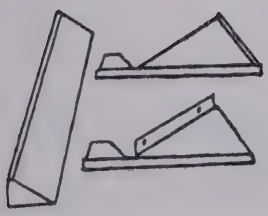
Junction Box



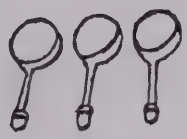
Anemometer/
Wind Vane



Junction Box Cable

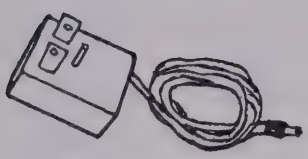


Desk Stand

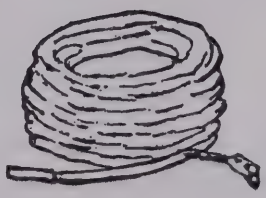


Anemometer Cups

Cable Ties



AC Adapter

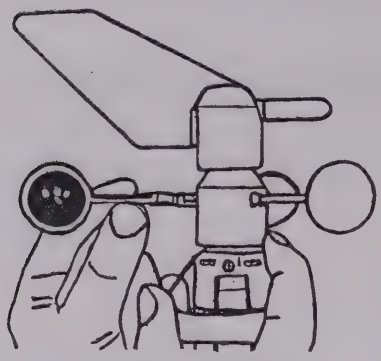


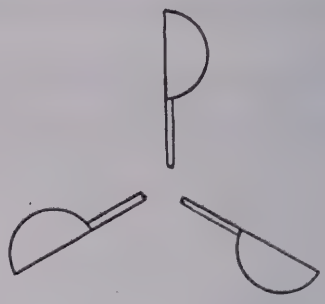
Temperature Sensor

Not shown: 2 screws for desk stand; 2 screws for wall mounting keyboard/display unit; 2 drywall screws for wall mounting keyboard unit; mounting bracket and screw for temperature sensor.

3. Plug each cup arm firmly into a retaining clip on the anemometer housing. Be sure that each cup arm snaps solidly into its retaining clip.

NOTE: THE CUP ARMS MUST BE ORIENTED AS SHOWN OR WIND DIRECTION WILL BE INCORRECTLY DISPLAYED and the cup arms will not properly lock into the clips.

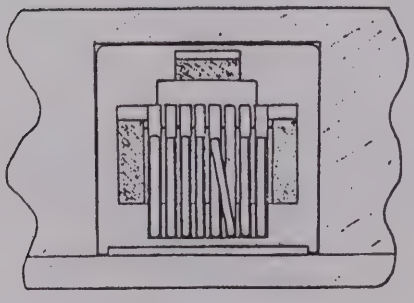




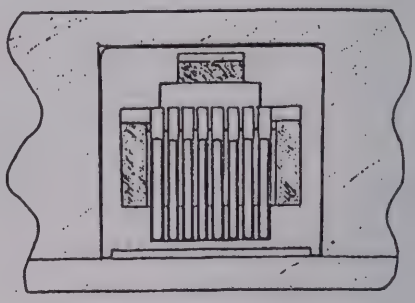
(TOP VIEW)

4. Check all receptacles for crossed wires (see illustration below). This can occur during plug-in and unplugging of the cables. It can be corrected by using a pair of tweezers to gently lift the wire back into the correct slot.

WRONG



RIGHT

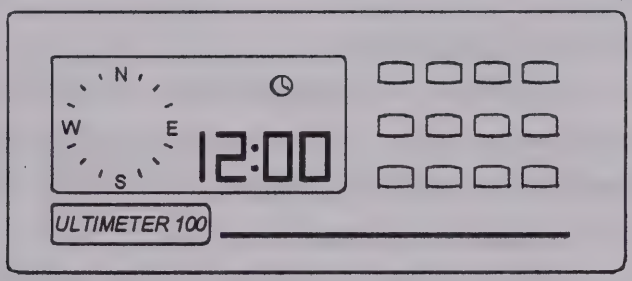


5. Without uncoiling the cables, plug the wind vane cable and the temperature cable into the junction box, in accordance with the markings on top of the junction box.

NOTE: If you have ordered any extension cables, do not uncoil them, but insert each between the junction box and the thermometer or anemometer/wind vane, just as it will be used in your actual installation.

5. Uncoil the 8 ft. junction box cable and plug one end into the receptacle on the back of the keyboard/display unit. Plug the other end into the junction box, opposite the temperature cable.

6. Plug the ac adapter cable into the junction box, then plug the adapter itself into a 110 volt 60 cycle outlet. After 2 or 3 seconds, the liquid crystal screen will come on, displaying the clock symbol, "12:00" and the compass rose for wind direction, as shown below.



Test Anemometer/Wind Vane Functions

1. Press the wind speed key, marked ⊕.

2. If you wish to display wind speed in units other than mph, press ⊕ again and keep it pressed. The screen will flash 3 times, then display wind speed in m/s. Each time you repeat the procedure, wind speed will be displayed in alternate measurement units; mph, m/s, knots, or km/h.

3. Blow gently and steadily on the anemometer cups, so they rotate clockwise when viewed from above and the screen displays a fairly steady wind speed reading of 4 mph or more (8 km/h or 4 knots). Stop blowing when a wind direction arrow is displayed within the compass rose. The wind direction sensor works only while the anemometer cups are spinning. This prevents any false indication of the last wind direction.

4. Point the wind vane in the opposite direction. Again blow gently and steadily on the cups. The wind direction arrow will shift to the opposite side of the compass rose.

5. Now blow on the cups a little harder, until the reading increases, then let the cups stop.

6. Press the up key, which is marked (Δ). The screen will display the highest wind speed registered while you were blowing on the cups. The time and date at which the high wind speed occurred will be alternately displayed (see "Displaying Stored Data" section for complete information). Don't worry that time and date are not yet correct - we'll be setting them in "Initial Adjustments" instruction section.

NOTE: The *ULTIMETER 100* does not display a low wind speed value, simply because zero is normally the lowest wind speed measured.

7. Press any function key to exit the highest value display.

Test Temperature Functions

1. Press and release the temperature key, which is marked (🌡) on the keyboard/display unit. The screen will display current outdoor temperature in degrees Fahrenheit and a thermometer symbol.

2. Press (🌡) again and keep it pressed. The screen display will flash 3 times, then display indoor temperature in degrees Celsius. Release the key. Repeat this procedure until the units you intend to use are displayed. Each time you repeat this procedure, temperature will be displayed in alternate units; Celsius or Fahrenheit.

3. Hold the temperature sensor in your hand for 2 or 3 minutes. The outdoor temperature indicated on the screen will rise.

4. Release the temperature sensor and allow the indicated temperature to come back down several degrees.

5. Press the up key, which is marked (Δ). The screen will display the date, highest temperature registered, and time it occurred, while you were holding the sensor.

6. Press any function key to exit the highest value display. When you are entirely satisfied with the instrument's performance, you are ready to proceed.

7. Unplug the junction box cable from the back of the keyboard to erase test readings from memory.

III. PLANNING YOUR INSTALLATION

Please take a few minutes to plan the installation of your home weather station. You'll help assure your long term satisfaction with the installation and almost certainly save time and effort in the process.

It may be helpful to remember that the cable lengths are:

Wind Sensor: 40 feet Temperature Sensor: 25 feet
Rain Gauge (Optional): 40 feet Junction Box Cable: 7 feet
AC Adapter Cord: 6 feet

First you must decide where each system component is to be installed. We suggest that you determine the optimum location of the prime components in the order shown below.

Control Unit Location - The primary considerations in placement of the Keyboard/Display unit are: which room it should go in, and should it be wall mounted or desk mounted.

Room Selection

- in which room will the data be most useful (e.g. bedroom, kitchen, hallway near hall closet, solarium, etc.);
- in which room will the most people be able to enjoy and use the data (e.g. living room or family room);
- other factors being equal, which room will make for easiest wiring.

Wall Mount Advantages

- better visibility from most of the room;
- wiring can often be completely concealed -- may offer shorter wire runs to outside sensors, possibly avoiding the need for extension cables.

Desk Mount Advantages

- convenient access to keyboard;
- optimum visibility from desk chair.

Anemometer/Wind Vane Location - The anemometer/wind vane is designed to clamp around the top 3-1/2 in. of a mast having a diameter of at least 1 in. and not more than 1-1/4 in. An aluminum mast is ideal (available at K-Mart and many other stores) but you can also use a thin-wall steel mast, of the type sold by Radio Shack and other stores.

NOTE: DO NOT MOUNT THE WIND SENSOR DIRECTLY ON TOP OF IRON PLUMBING PIPE OR EMT ELECTRICAL CONDUIT. Pipes and conduit have relatively thick ferrous (magnets will stick to them) walls, which can interfere with the proper operation of the magnets in the anemometer/wind vane.

If you wish to use iron pipe or electrical conduit as a mast, simply add a short section of PVC to the top and clamp the wind sensor onto the PVC. There are many ways to do this, but two typical methods are:

a. If you are using a 3/4 inch water pipe as a mast, screw a PVC pipe adapter with a 6-inch piece of 3/4 inch Schedule 40 PVC pipe onto the top of your mast.

b. If you are using 1-inch EMT electrical conduit as a mast, just press a 12-inch long piece of 3/4 inch Schedule 40 PVC pipe six inches into the top of the conduit.

In either method, PVC should not be used for the entire mast because the **MAST MUST BE GROUNDED**. In addition, PVC pipe is not strong enough to be used as a mast.

Considerations for locating the mast:

- use an existing TV or FM-type mast if you can.
- mast should extend at least 5 feet (more if possible) above the highest part of your roof or other nearby obstruction. You may be able to add an extension to an existing mast.
- the mast should, as nearly as possible, be exactly vertical.
- the top 3-1/2 in. of the mast must be free. Again, you may be able to add a short extension to an existing mast.
- if you are installing a new mast, it will be most economical to locate it within 40 ft. of the junction box, so you won't need an extension cable.

- mast must not be mounted on, or directly next to, an active chimney. Flue gasses are very corrosive.

CAUTION: MAKE SURE THE MAST YOU USE IS PROPERLY GROUNDED. IF YOU HAVE ANY DOUBT, HAVE IT CHECKED BY A QUALIFIED TV SERVICE PERSON.

Temperature Sensor Location

NOTE: Before drilling holes and permanently installing the temperature sensor, experiment with the temperature sensor location to be sure of satisfactory readings.

Generally speaking, you should locate the temperature sensor:

- in the shade where it can never receive direct sunlight
- protected from wind and rain
- where air can circulate freely around it (e.g. avoid closed gable ends that can trap a pocket of warm air)
- away from incidental heat sources, such as roof circulation vents
- not directly above radiated or reflected heat sources such as cement patios or large picture windows
- so that the last three feet of cable (or more) are outside the structure in the open air
- so that the cable, rather than the sensor itself, is secured by the supplied mounting clamp

It is surprising how much these factors affect temperature readings; we have seen errors of 4° to 6° caused by just one of these factors.

Rain Gauge (Optional) Location

- in the open, away from overhanging trees
- well clear of the house or other structures that might block blowing rain
- easily accessible for periodic inspection and cleaning

Junction Box Location

- must be indoors
- must be close to an ac outlet, so the ac adapter cord can reach it
- a vertical orientation is preferable to minimize the possibility of dust getting into the junction box

If you will not require extension cables (that is, if the external sensors are each close enough to the control unit location) it is usually best to locate the junction box within 8 feet of the control unit.

Extension Cables

Normally it is best not to extend the total cable length from the temperature sensor to the keyboard display unit beyond 33 feet (the 25-foot temp sensor cable plus the 8-foot junction box cable). Longer cables tend to increase the temperature reading slightly. For example, a total length of 193 feet (using four 40-foot extension cables) can increase temperature readings about 1.5°F.

There is no problem extending the anemometer/wind vane cable or optional rain gauge cable to 200 feet or more. Be sure the extension cable used is correctly wired - if in doubt, proper extension cables may be obtained from Peet Brothers Company.

Instead of extending more than one sensor cable, it may be possible and more economical to place the junction box further from the keyboard/display unit, using a longer junction box cable.

> NOTE: If you plan to use a sensor extension cable that will be joined outside, you must plan to waterproof the connection. We offer inexpensive and effective weatherproofing kits for this purpose.

IV. INSTALLING YOUR *ULTIMETER 100* COMPONENTS

Installing the Anemometer

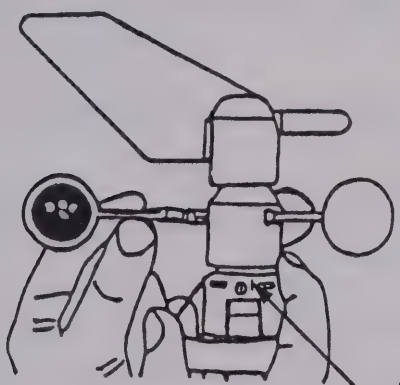
1. Slide the locking ring up as far as it will go on the fingers.

2. Place the anemometer/wind vane over the top of the mast with all four fingers on the outside of the mast.

3. Slide the clamping ring down over the fingers until you start to feel significant resistance.

4. Find the North Calibration Mark on the anemometer (this is the small silver line located near the screw head - see illustration below). Rotate the anemometer on the mast until the calibration mark is facing due north. Use a compass or other directional reference.

Tip: Use a piece of tape to hold the wind vane pointed in the direction of the silver mark, and use the wind vane pointer to help to install the anemometer in the correct position. Rotate the anemometer on the mast until the wind vane points North (remember to remove tape!).



5. Firmly clamp the anemometer in place by repeatedly pulling the locking ring down, first a little on one side, then a little on the opposite side, keeping it more or less level, until you can't pull it down any further.

6. Using the cable ties provided, secure the cable to the mast. One tie should be placed just about 2 in. below the anemometer/wind vane. The other two should be evenly spaced below that.

Installing the External Temperature Sensor

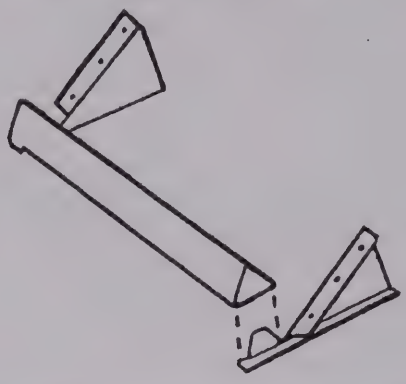
1. Drill a pilot hole at the desired location.

2. Mount the supplied clamp and temperature sensor taking care that its protective metal housing does not touch any nearby surface. The metal end should be pointed "up", with the cable exiting downward, to discourage water droplets or ice from "hanging on" to the metal housing.

Installing the Keyboard/Display Unit

Desk or Shelf Mounting

1. Assemble the desktop stand as shown below.



2. Place the keyboard/display unit on the stand so the two alignment pins on the stand fit firmly into the matching holes on the back of the instrument.

3. Secure the Keyboard/display unit to the stand, using the two screws provided.

4. Insert the plug of the junction box cable into the back of the control panel. Be sure it "clicks" into place.

5. Position the assembled unit as desired.

Wall Mounting

1. Drill two pilot holes 5 in. apart for the supplied wood screws or supplied drywall anchors. Mount at a height slightly above eye level for best viewing angle.

2. Install the screws, leaving them about 1/8 in. out from the wall.

3. Insert the plug of the junction box cable into the back of the control panel. Be sure it "clicks" into place.

4. If the junction box cable is to run down the wall, insert the cable into the groove provided on the back of the keyboard/display unit.

5. Hang the keyboard/display unit from the two projecting screws.

Installing the Junction Box

1. Drill two pilot holes 3-1/2 in. apart at the desired mounting location.
2. Mount the junction box; use wood screws (provided) for a wooden wall or drywall anchors (provided) for a sheet rock wall.
3. Plug in cables from the ac adapter, keyboard display unit, thermometer, anemometer/wind vane, and rain gauge, if applicable.

V. CONNECTING THE *ULTIMETER 100* SYSTEM

Connect components to configure your system as shown in the Wiring Diagram.

Using the following sequence, apply power to your system:

1. Plug one end of the 8-conductor cable into the junction box. Plug the other end into the back of the instrument.

2. Connect the AC adapter into an AC outlet. In 110 volt systems, be sure to use the 3-prong AC adapter and a properly grounded 3-prong outlet. Then, plug the AC adapter output cable into the junction box. Allow 2 or 3 seconds for the keyboard display to come on.

3. Install a fresh 9 volt back-up battery (not included) at this time, in order to preserve any settings or adjustments that you make while installing the system.

The back-up battery compartment is located on the lower right side of the keyboard/display unit. To open the compartment, slide the cover in direction of arrow. Insert a 9-volt battery, with the + and - terminals oriented as shown in

the diagram on the back of the keyboard housing. Replace the cover.

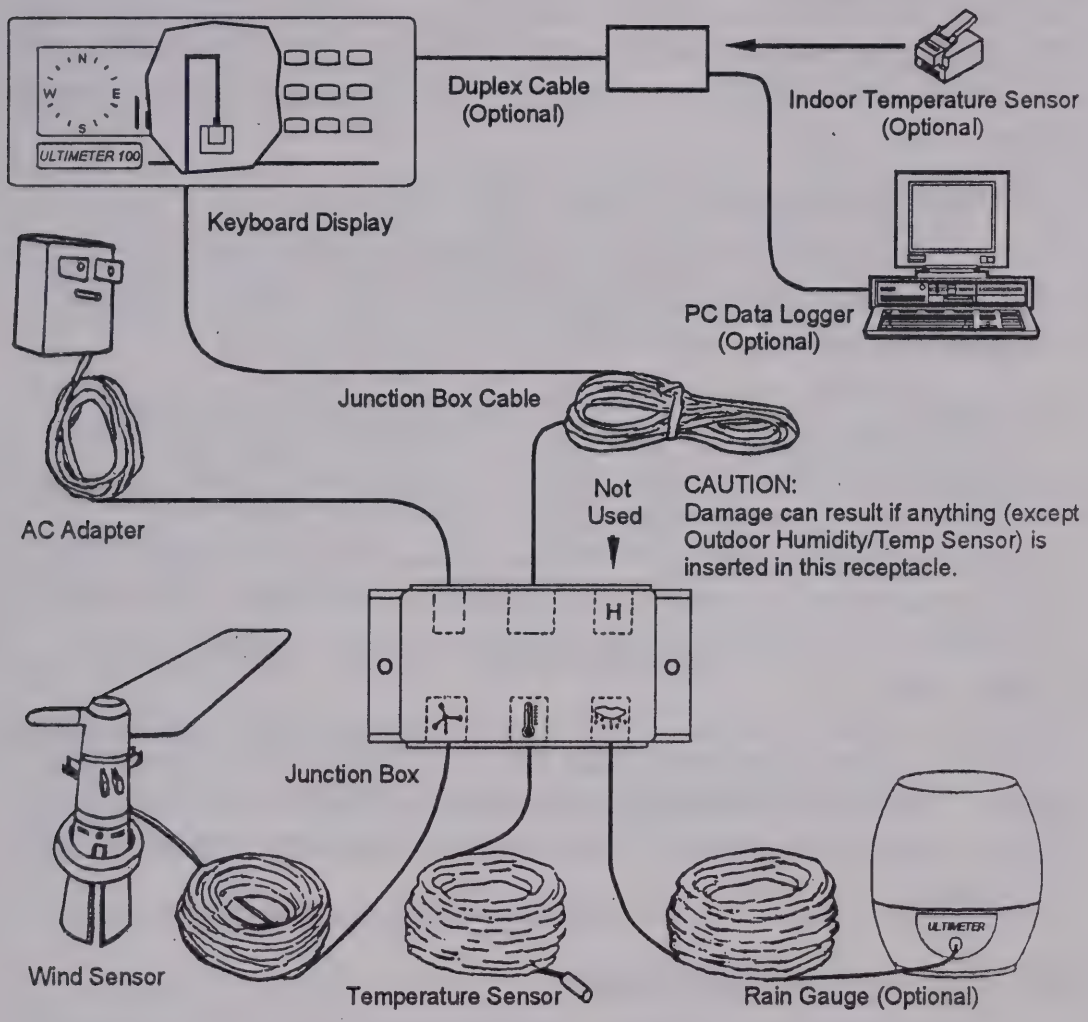
4. Press [-o-] and [🔔] simultaneously to initiate the battery check function. In a few seconds, the flashing battery symbol should go out.

About the Battery Symbol in the Display

In operation, a flashing battery symbol indicates a weak battery in need of replacement. A non-flashing battery symbol indicates the instrument is operating on battery power, and the AC adapter or circuit breaker should be checked.

WIRING DIAGRAM

Connect components to Junction Box as shown in diagram below.



Use of both the PC Data Logger (Optional) and the Indoor Temperature Sensor (Optional) requires a Duplex Cable.

NOTE: BEFORE YOU INSTALL PLUGS IN RECEPTACLES, be sure to check connectors as shown on p. 10.

VI. INITIAL ADJUSTMENTS

ADJUST THE LEAP YEAR COUNTER

This instrument features a perpetual calendar, using a leap year counter to keep track of each leap year. The leap year counter must be adjusted to the number of years until next leap year (from 0 to 3). For it to operate correctly, you must adjust the leap year setting before you set the date. If the current year is a leap year (1996, 2000, 2004, etc.), skip to "Set Date and Date Format" below.

1. Press and release (clock) and (calendar) simultaneously. The clock and calendar symbols will appear on the screen and the instrument will briefly display LP (for LeaP year). Then it will display the leap year setting, which is initially 0.

2. Press (△) and KEEP IT PRESSED until the leap year setting begins to change. Then press (△) or (▽) as required until the leap year setting shows the number of years until leap year, i.e. "1" if the present year is 1995, "0" if the present year is 1996, "3" for 1997, "2" for 1998, and "1" for 1999. The leap year counter will advance at the end of each year.

NOTE: Adjust the leap year counter BEFORE you set the date. If you have already set the date, check it after setting the leap year counter, and adjust the date display as necessary.

SET DATE AND DATE FORMAT

1. Press and release (calendar) . The date will be displayed in mm/DD format. If this is satisfactory, you may skip to Step 3.

2. If you prefer a DD/MM date display, press and hold (calendar) until the display stops flashing (the display will flash three times, then change to DD/mm format). To change back to MM/DD format, repeat the procedure.

3. Press and hold the (△) for at least three seconds. The date display will flash three times, then enter a setting mode and the date will begin to change. Press (△) or (▽) as

required to set the correct date. If you press and hold △ or ▽, the display will change rapidly.

4. When you have finished setting the date, press ▦ to return to normal operation.

SET TIME AND TIME FORMAT

1. Press the 🕒 key.

2. If you prefer a 24-hour clock display, press 🕒 again and hold until the display stops flashing (the display will flash three times, then change to 24-hr format). To change back to 12-hr format, repeat this procedure.

3. Press and hold △ for at least 3 seconds. The time display will flash three times, then enter a setting mode and the time will begin to change. Press △ or ▽ as required to set the correct time. If you press and hold △ or ▽, the display will change rapidly.

4. Press 🕒 to return to normal operation.

SELECT TEMPERATURE UNITS

Temperature is initially displayed in degrees Fahrenheit. Use the following procedure if you prefer degrees Celsius.

1. Press and release the 🌡 key.

2. Press 🌡 again and hold until the display stops flashing. Temperature will be displayed in Celsius. To return to Fahrenheit, repeat this step.

NOTE: Units for wind chill 🌬🌡 will be the same as for temperature.

SELECT WIND SPEED UNITS

Wind Speed is displayed initially in mph. You may select m/s, knots, or km/h as preferred.

1. Press and release the 🌬 key.

2. Press again and hold until the display stops flashing. Wind speed will be displayed in m/s.

3. Repeat this procedure to select knots or km/h.

SELECT RAIN GAUGE INCREMENTS AND RAINFALL UNITS

If your *ULTIMETER* 100 system does not yet include a self-emptying rain gauge, you may skip this section and proceed to "DISPLAYING CURRENT DATA".

Use the procedure below to tell the instrument the measuring increment of your rain gauge. Allowable rainfall increments are: 0.01 inches, 0.25 mm, 0.1 inches, 0.1 mm, and 2.5 mm.

1. Press and release the key. The rain icon and "0.00 in" will appear in the display. Each time your rain gauge reports an increment of rain, the rain display will increase by 0.01 inches. If your rain gauge reports rainfall in increments of 0.01 inches, skip the rest of this section.

2. Press and hold the key a second time until the display stops flashing. "0.00 mm" will appear in the display. Each time your rain gauge reports an increment of rain, the rain display will increase by 0.25 mm. If your rain gauge reports rainfall in increments of 0.25 mm, skip the rest of this section.

3. Press and hold the key a third time until the display stops flashing. "0.0 in" will appear in the display. Each time your rain gauge reports an increment of rain, the rain display will increase by 0.1 inches. If your rain gauge reports rainfall in increments of 0.1 inches, skip the rest of this section.

4. Press and hold the key a fourth time until the display stops flashing. "0.0 mm" will appear in the display, with the "mm" flashing. Each time your rain gauge reports an increment of rain, the rain display will increase by 0.1 mm. If your rain gauge reports rainfall in increments of 0.1 mm, skip the rest of this section.

5. Press and hold the [rain] key a fifth time until the display stops flashing. "0.0 mm" will appear in the display, with the "mm" not flashing. Each time your rain gauge reports an increment of rain, the rain display will increase by 2.5 mm. If your rain gauge reports rainfall in increments of 2.5 mm, this is the correct setting.

TO ADJUST THE LONG-TERM RAINFALL TOTAL

If you wish to include rainfall accumulated prior to installation of your *ULTIMETER 100*, you must initialize the long-term rainfall memory to display the current week-to-date total, month-to-date total, or year-to date total rainfall.

To initialize the long-term rainfall total:

1. Press and hold [rain] and [△] simultaneously until the displayed rainfall total is close to correct.

2. Press [△] or [▽] repeatedly until the desired value is displayed. Press [rain] to return to normal operation.

VII. DISPLAYING CURRENT DATA

TO DISPLAY THE CURRENT VALUE OF WIND SPEED, WIND CHILL, OUTDOOR TEMPERATURE, TIME, OR DATE:

Press and release the desired data key: , , , , or . The corresponding symbol will appear on the screen and the current data value will be displayed.

NOTE: When you first press , the instrument will display the outdoor temperature.

TO DISPLAY CURRENT INDOOR TEMP (requires optional Indoor Temperature Sensor)

1. Press and release to display outdoor temperature.
2. Next, press and release a second time to change display from outdoor reading to indoor reading. The symbol will appear in the display and the current indoor value will be shown.

Automatic Scanning

The instrument can continually scan any of the following data at 5-second intervals:

Wind Speed	Today's Rainfall
Wind Chill	Time
Temperature (Outdoor)	Date

To select data to be scanned:

1. Press and keep it pressed until "SEL" (select) appears on display.
2. Press the data key of each function you wish to include in the scan.
3. Press to end the selection process and start the scan.

To exit scan mode, press any data key.

To resume scanning, press and release .

VIII. THE *ULTIMETER 100* HIGH/LOW MEMORY SYSTEM

The *ULTIMETER 100* keyboard monitors and displays current data from five different sensors (plus calculated wind chill temperature). It also maintains three memory banks for high and low records. The instrument will be most valuable to you if you understand the three memory banks:

TODAY'S HIGHS, LOWS, AND RAINFALL

At midnight each night, the *ULTIMETER 100* starts keeping track of high and low values, and rainfall, for the new day. At any time during the day, the instrument can tell you what the highest and lowest values have been, thus far in the day. "TODAY'S" high and low values are automatically maintained, and cannot be manually altered or reset. If you ever wish to record highs and lows, or rainfall, starting from a specific time, you may use the user-resettable "Long Term" high/low memory described below.

YESTERDAY'S HIGHS, LOWS, AND RAINFALL

Each midnight the instrument moves TODAY'S highs and lows and rainfall into separate memory, now calling them YESTERDAY'S values. At any time in the following day, you can still retrieve yesterday's high and low values and rainfall - directly from the keyboard or remotely by phone, modem, or radio link. YESTERDAY'S values are automatically maintained, and cannot be manually altered or reset. If you ever wish to record highs and lows or rainfall starting from a specific time, you may use the user-resettable "Long Term" high/low memory described below.

LONG TERM HIGHS AND LOWS

The third memory bank is extremely flexible. It keeps track of highest and lowest readings, and accumulated rainfall, since the last time you reset the stored value. You can individually reset any high or low value in this memory whenever you wish. For example, you may wish to keep close watch on a major storm by resetting the LONG TERM highest wind speed memory, or the LONG TERM rainfall total just before the storm hits, or even again during the storm.

There is also a master reset that resets all of the LONG TERM stored values simultaneously. If you wish to track monthly highs and lows, just use the master reset at the beginning of each new month.

IX. DISPLAYING STORED DATA

TO DISPLAY HIGHEST VALUES

To display the highest values of wind speed or temperature for today, yesterday, and long term:

1. Press the desired data key to display the current value.

2. To display TODAY'S highest value, press [△] once. The display will repeatedly cycle through today's date, today's high value, and the time at which it occurred.

3. To display YESTERDAY'S highest value, press [△] a second time. The display will repeatedly cycle through yesterday's date, yesterday's high value, and the time at which it occurred.

4. To display the LONG TERM highest value, press [△] a third time. The display will repeatedly cycle through: the date the highest value occurred, the highest value since last reset, and the time at which it occurred. The Long Term high value is the highest value recorded since you last reset this memory. The Long Term display is easily recognized by the flashing ▦ when the date is displayed.

TO DISPLAY LOWEST VALUES

1. Press the desired data key to display the current value.

2. To display TODAY'S lowest values, press [▽] once. The display will repeatedly cycle through today's date, today's low value, and the time at which it occurred.

3. To display YESTERDAY'S lowest values, press [▽] a second time. The display will repeatedly cycle through yesterday's date, yesterday's low value, and the time at which it occurred.

4. To display the lowest values SINCE LAST RESET, press ▽ a third time. The display will repeatedly cycle through: the date the lowest value occurred, the lowest value, and the time at which it occurred. This display mode is easily recognized by the flashing ▦ when the date is displayed.

TO DISPLAY RAINFALL

1. To display TODAY'S rainfall (thus far since midnight), press ☔. The instrument will display today's total rainfall.

2. To display YESTERDAY'S rainfall (from midnight to midnight) press △. The display will alternate between yesterday's date and yesterday's total rainfall.

3. To display the LONG-TERM ACCUMULATED rainfall (since you last reset this value to zero), press △ again. The display will alternate between the date you last reset this total and the rainfall accumulation since that date.

X. RESETTING LONG TERM MEMORY VALUES

TO RESET A SINGLE LONG TERM HIGH OR LOW MEMORY

NOTE: Only Long Term memory values can be reset; you cannot clear Today's or Yesterday's values. These are automatically reset (updated) by the instrument.

1. First, display the stored Long Term data you wish to clear.

2. Press and hold the [-O-] key for at least three seconds. The display will flash three times, then change to a display of the current value, the current time, and today's date.

TO RESET ALL LONG TERM HIGH, LOW, & RAIN MEMORIES

Instead of resetting each Long Term high and low memory individually, you may simultaneously reset all Long Term highs and lows, including the Long Term rainfall total. To do so:

Press and hold [-O-] and [▦] simultaneously for at least three seconds. The display will flash three times, then stop. All Long Term high and low values will be replaced by the current values, and the Long Term rainfall total will be reset to zero.

You may wish to use this "master reset" procedure on the first day of each new month. All Long Term high and low values will then be the highest and lowest values for the month to date.

TIP: If you always use only the master reset (as opposed to individual resets), the date shown on the Long Term rainfall display will be the date when all highs and lows were last reset.

XI. ALARMS

The *ULTIMETER 100* includes the following 15 adjustable alarms: High Wind Speed, High Outdoor Temperature, Low Outdoor Temperature, High Indoor Temperature, Low Indoor Temperature, Low Wind Chill Temperature, Flash Flood Alert, and Time Alarm.

When an alarm setting is exceeded, the display flashes the alarm setting and a high-pitched alarm will sound. The sound will stop automatically after about 30 seconds, but the display will continue flashing until reset.

TO SET AN ALARM (other than Flash Flood Alert)

1. Select the function for which you wish to set an alarm by pressing [ ], [ ], [ ], or [ ]. If you are setting an alarm for wind speed, wind chill, or time, skip to step (3).

2. This instrument has both a high and a low alarm for temperature. Press [△] to set a high alarm or [▽] to set a low alarm.

3. Press and release [ ] to display the current alarm value.

4. Press and hold [△] or [▽] until the display changes, then press repeatedly until desired alarm setting is displayed.

THE FLASH FLOOD ALERT

This instrument provides a rain rate alarm, intended for use where there is danger of local flooding or downstream flash flooding. Flash flooding can result when heavy rainfall occurs at higher elevation, and water rushes toward low-lying areas. The rain rate alarm warns that heavy rainfall has occurred, which could result in impending local flood conditions, or flash flooding within your vicinity (or possibly downstream, outside of your vicinity). Bear in mind that your success in predicting flash flooding depends upon many factors, in addition to rain rate: terrain, elevation, drainage, etc.

Before setting the flash flood alert, be sure to select rainfall units according to the type of rain gauge you are using.

The rain rate alarm is set in inches-of-rain or mm-of-rain per hour. An alarm will sound of a specified minimum amount of

The rain rate alarm is set in inches-of-rain or mm-of-rain per hour. An alarm will sound of a specified minimum amount of rain (called the threshold) falls at a rate equal to or greater than the rain-rate setting. The default threshold value is 0.5 in, or 12.7 mm.

EXAMPLE: If you set an alarm for a rain rate of 2 inches per hour, the alarm will sound if 0.5 inches of rain (the default threshold value) falls within 15 minutes, which equals an hourly rate of 2 inches per hour.

To adjust the Flash Flood Alert rain rate:

1. Press and release .

2. Press . The rain, clock, and alarm symbols will appear in the display, and the present rain rate alarm setting will be displayed.

3. Press and hold or until a value is shown and begins to change. The rain rate can be adjusted from 0.1 in/hr to 10 in/hr in 0.1-in increments, or from 2.5 mm/hr to 254.0 mm/hr in increments of 2.5 mm/hr.

4. Press or repeatedly until the desired rain rate setting is shown.

To adjust the Flash Flood Alert threshold value:

1. Press and simultaneously. The rainfall and alarm symbols will appear in the display, and the present threshold value will be shown.

2. Press and hold or until the threshold value begins to change. The threshold value can be adjusted from 0.1 inch to 0.5 inch in 0.1-inch increments, or from 2.5 mm to 12.5 mm in increments of 2.5 mm.

3. Press or repeatedly until the desired threshold value is shown.

TO MOMENTARILY STOP AN ALARM FROM SOUNDING

With the alarm setting displayed, press the -O- key. The alarm sound will stop temporarily. When you return to normal operation (displaying data), the alarm will sound again when the current value exceeds the alarm setting.

TO DISABLE AN ALARM

First, display the alarm setting. If the alarm has been triggered, the alarm setting will already be displayed.

Then, press and hold the -O- key for at least three seconds. The display will flash three times, then read "OFF".

XII. THE *ULTIMETER 100* SERIAL PORT

The *ULTIMETER 100* provides a unique 3-mode serial port to facilitate computer data logging and remote data reporting via telephone, modem, or RF link. Each of the three modes can be accessed by pressing and holding a combination of two keys. The following is a brief description, to provide an idea of the capabilities of each mode. Complete details are available to programmers upon request.

PC Data Logger Software (Windows or DOS) and PC Interface Cables are available through your dealer.

DATA LOGGING MODE

In Data Logging Mode, the instrument puts out a steady stream of records, about one per second. Each record includes all current readings including time and date. Key Combo: Press and hold [-O-] and [fan] for 3 seconds to enter this mode.

PACKET MODE

In Packet Mode, the instrument puts out one record every five minutes. Each record includes all current values, plus the highest wind speed over the past five minutes with the associated wind direction, station calibration numbers, and current time and date. Key Combo: Press and hold [-O-] and [fan+thermometer] for 3 seconds to enter this mode.

COMPLETE RECORD MODE

In Complete Record Mode, the instrument puts out a steady stream of records, about twenty per minute. Each record includes all current values, today's high and low values, yesterday's high and low values, and long term high and low values, station calibration numbers, and current time and date. Key Combo: Press and hold [-O-] and [rain] for 3 seconds to enter this mode.

NOTE TO SERIAL PORT USERS: It is essential to make the correct Leap Year setting (see Section VI); otherwise, date data from the serial port may be incorrect.

XIII. Supplemental Wind Vane Calibration Adjustment

Your anemometer/wind vane has been factory-calibrated to correctly indicate wind direction when installed per the instructions on p. 17, and should not require recalibration. However, if you wish to adjust wind direction readings after installation (to correct a difference between display readings and actual wind direction) without physically realigning the sensor, you may use the following procedure.

1. Perform when you have a fairly steady breeze from a known direction.
2. Press (wind) and (temp) simultaneously to display the wind vane correction constant (the keyboard initially has a correction constant of zero).
3. Press and hold (△) or (▽) to adjust the wind vane correction constant. After approximately 3 seconds the wind vane correction will start changing. Increase the constant if you want the direction diamond on the display to move counter-clockwise to match actual wind direction. Decrease the constant if you want the direction-indicating diamond to move clockwise to match actual wind direction.
4. Repeat Step 4 as necessary until the wind direction is correctly displayed. Record the Wind Vane Correction Constant below.
5. Press any function key to leave this operation and retain the correction constant that is displayed.

NOTE: The correction constant is a number from 0 through 255. Each digit represents approximately 1.4 angular degrees of correction (360 ÷ 256) that is added to the uncorrected wind direction.

Record your Wind Vane Correction Constant here_____

XIV. ROUTINE MAINTENANCE

Care of Liquid Crystal Display

If the keyboard display unit's LCD becomes dirty, clean with a soft damp cloth only. Use no harsh or abrasive cleaners, as these will permanently scratch the surface of the display. Do not spray any liquids or cleaners directly on the display unit (especially the keyboard buttons).

Care of Anemometer/Wind Vane

The anemometer/wind vane is designed for years of reliable operation, with no scheduled maintenance required. It features bearings of durable acetal polymer and stainless steel balls, which require no lubrication. The introduction of oils or dry graphite lubricants into the bearings will tend to slow them down, resulting in inaccurate wind speed readings.

For owners of black anemometers (only): If you believe the anemometer's rotor or wind vane are not turning freely, you may remove them for inspection and cleaning as follows: Grasping the vane and rotor at the same time (in the palm of your hand), hook your fingers under the cup arms' retaining clips and pull upward. After overcoming initial resistance, the vane and rotor will be removed together. Remove any foreign material (i.e. cobwebs, soot, pollen, etc.) from inside the vane and rotor. The bearings may be cleaned using compressed air.

Do not use oil or dry graphite lubricants.

In Case of Non-Responsive Keyboard

Sometimes an electrical storm or line power surge can cause the keyboard to be disabled. To correct this condition, unplug the junction box cable from the back of the keyboard display and remove the 9-volt battery (however, be advised that all memories and initial settings will be lost). Install the battery again and reconnect the junction box cable.

NOTE: If you have adjusted wind direction calibration yourself (ref. page 33), it will be necessary to re-enter the Wind Vane Correction Constant after performing this procedure. Follow instructions under "Wind Vane Calibration Adjustment" on p. 33. If the problem persists, please inquire about our special 4-Line Static Electricity Discharge Unit.

XV. REPAIR AND EXCHANGE SERVICE

In Case of a Problem

Your *ULTIMETER 100* is designed to provide years of trouble free operation. If the instrument completely stops operating, the cause is probably inadequate power due to a faulty ac adapter, a faulty connection to the adapter, or weak or missing battery when operating from internal power. To correct the problem, disconnect all batteries and external power, then reapply proper power.

Also, be sure to see page 10 (crossed wires in receptacles) and page 7 ("Answers to Commonly-Asked Questions").

If a problem persists, please write or call our Technical Service Department at (732) 531-4615. We will do everything possible to assure your satisfaction.

Repair and Exchange Service

Any defective *ULTIMETER 100* may be repaired or exchanged for a factory reconditioned instrument of the same type with like-new performance. Under warranty there is no charge. Beyond warranty the charges are modest, depending upon the condition of the instrument.

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WARRANTY

Each *ULTIMETER 100* carries a limited warranty against defects of material or workmanship for a period of 1 year from the date of initial purchase. Our responsibility under this warranty is limited to the repair or replacement of instruments returned to us postage paid, together with proof of purchase date. This warranty shall not apply to instruments subjected to: improper installation, any alterations, misuse, tampering, or unauthorized service. It does not cover damage due to accidents, lightning, or other acts of God. Neither we nor our representatives, distributors, nor dealers shall be liable for any incidental or consequential damages. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion or limitation may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

XVI. SPECIFICATIONS

Wind

Speed Range: 0 to 274 km/h
0 to 170 mph
0 to 76 m/s
0 to 148 knots

Accuracy: ± 5 @ 274 km/h
± 3 @ 170 mph
± 2 @ 76 m/s
± 3 @ 148 knots

Direction: 16 point analog "compass rose" display

Cable: 40 ft., 4-conductor, unshielded w/modular plug

Outdoor Temperature

Range:- -55 to +150 degrees F.
-48 to +66 degrees C.

Accuracy: ± 2 degrees F.
± 1 degree C.

Cable: 25 ft., 4-conductor w/modular plug

Indoor Temperature (with optional sensor)

Range:- 32 to 110 degrees F.
0 to 43 degrees C.

Accuracy: ± 2 degrees F.
± 1 degree C.

Wind Chill

Range:- -150 to +98 degrees F.
-101 to +37 degrees C.

Rain (with optional sensor)

Units: inches, millimeters

Increments: 0.1", 0.01", 2.5mm, .25mm, 0.1mm

(user selectable to match rain gauge increments)

Control Unit

Size: 6-3/4" x 2-3/4" x 1-1/4"

Display: Backlit Liquid Crystal

Numeral Size: 3/8" high

Desk or Wall Mount

Junction Box

Has receptacles for external power and all outside sensors.

Size: 4" x 1-3/4" x 7/8"

Primary Power

AC adapter 9 v DC output

Back-up Power

Provision for 9-volt alkaline battery

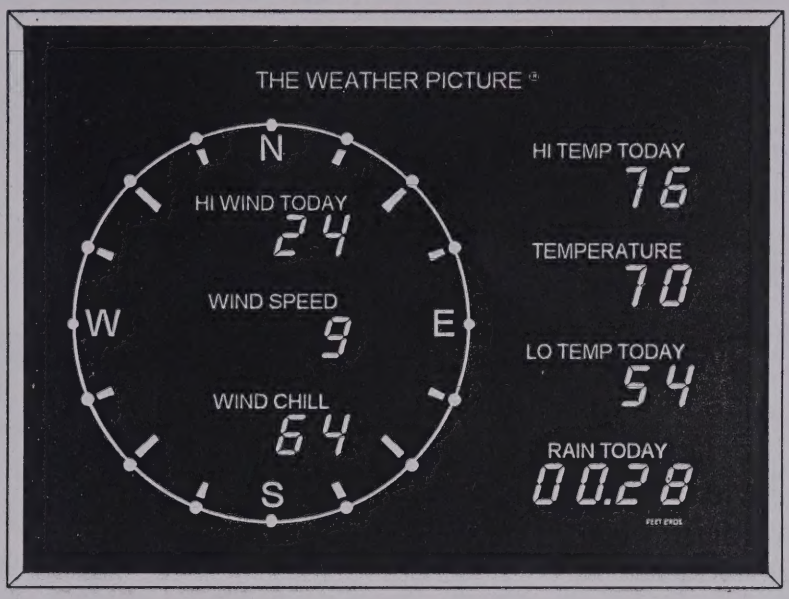
Optional Accessories

- Self-emptying Rain Gauges - several models available
- Indoor Temperature Sensor
- PC Data Logger Software and Interface Cable

Specifications necessarily subject to change.

XVII. AVAILABLE ACCESSORIES

We are continually developing new products and accessories to make your *ULTIMETER 100* Weather Station more interesting and valuable to you. Some of our most popular items are:



THE WEATHER PICTURE ***NEW* for '98!**

Finally a *big* weather display you can read from across the room - and handsome enough for any setting. THE WEATHER PICTURE displays information it receives from an ULTIMETER Weather Station, continuously providing and updating all the vital weather data you have pre-selected, without having to press a single key.

Its 8" compass rose and large 0.8" illuminated red numerals are clearly visible, day and night. THE WEATHER PICTURE is **perfect for homes as well as schools, hotels, offices, country clubs, stores, marinas, corporate lobbies, ski lodges, emergency management stations, etc.** - any place needing up-to-the-second *local* weather data. Can be totally customized to display any of over 60 weather functions on each numeric display. Available in two sizes (11"x 15" or 10"x11") and in two frame styles (brushed aluminum or teak).

Self-Emptying Rain Gauge

Automatically empties itself every 0.01" of rain and sends a signal to the keyboard/display unit, which maintains three independent rain totals: today's total rainfall, yesterday's total, and long-term total.

Indoor Temperature Sensor

Special modular design plugs into the side receptacle of the *ULTIMETER 100* keyboard - no additional cable required.

Splitter Junction Box

Allows the operation of a second keyboard/display unit, for installation in another room or adjacent building.

Radio Frequency Interference Filter

If the *ULTIMETER 100* is used near an extremely powerful radio transmitter, its high and low temperature readings can be affected. This would normally only be encountered in the immediate vicinity of commercial radio or TV stations, or high-power ham radio transmitters. If you think you are experiencing this problem, please inquire about our inexpensive, 30 dB 4-line RFI filter.

PC Data Logger

Special cable and software to record weather data on a personal computer. Features 4 simultaneous graphs of weather conditions over the last 20 hours, updated every five minutes. Or, you can display data from any selected part of the log file in graphic or tabular form.

For additional information about these or other accessories, please contact your *ULTIMETER 100* dealer or Peet Bros. Company. We'll be happy to advise you of latest developments and answer any questions you may have.